The Management University of Africa

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UNDERGRADUATE UNIVERSITY EXAMINATIONS

SCHOOL OF MANAGEMENT AND LEADERSHIP

DEGREE OF BACHELOR OF ARTS IN DEVELOPMENT STUDIES

BDS 109: STATISTICS

DATE: ***17TH AUGUST 2015***

DURATION: 2 HOURS

MAXIMUM MARKS: 70

INSTRUCTIONS:

1. Write your registration number on the answer booklet.
2. **DO NOT** write on this question paper.
3. This paper contains **SIX (6)** questions.
4. Question **ONE** is compulsory.
5. Answer any other **THREE** questions.
6. Question **ONE** carries **25 MARKS** and the rest carry **15 MARKS** each.
7. **Write all your answers in the Examination answer booklet provided.**

QUESTION ONE

a) Define the following terms: **(3 marks)**

i. Universal set

ii. Null set

iii. Disjoint set

b) Explain four roles of statistics in planning and control of a development projects **(8 marks)**

c) A group of 8 accountancy students are tested in project appraisal and statistics. Their rankings in the two tests were.

Student	Project appraisal ranking	Statistics ranking
A	2	3
B	7	6
C	6	4
D	1	2
E	4	5
F	3	1
G	5	8
H	8	7

Calculate the rank correlation coefficient and hence comment briefly on the value obtained **(5 marks)**

d) Compute chain base index numbers for the following data:

Year	2008	2009	2010	2011	2012	2013
Prices	3500	3800	4200	4000	3900	4100

(5 marks)

e) Distinguish between mutually exclusive events and independent events giving examples in each case **(4 marks)**

QUESTION TWO

The quality controller of a given project had an accurate record of all the iron bars produced in February, 2015. The following data shows those records:

Bar lengths (cm)	210-250	251-300	301-350	351-400	401-450	451-500	501-550
No. of bars	25	36	49	80	51	42	30

Calculate:

i. The standard deviation of the lengths of the bars **(7 marks)**

ii. The median of the distribution **(4 marks)**

iii. Karl Pearson coefficient of skewness **(4 marks)**

QUESTION THREE

a) Represent $(A^c \cap B)$ on a Venn diagram with universal set, $\mathcal{E}$ **(2 marks)**

b) The number of sales personnel employed at each of 10 exhibitions and the number of cars booked at each one are given as follows:

No. of Salesmen (X)	5	8	6	8	9	3	5	4	6	6
No. of cars (Y)	132	160	148	156	168	102	142	98	152	142

Determine the regression equation of the number of cars booked on the number of salesmen **(13 marks)**

QUESTION FOUR

a) Give the classical and empirical definitions of probability **(4 marks)**

b) The following table shows the number of insurance policies by class of community projects issued by the insurance company during the year 2011 to 2014

Policy type	2011	2012	2013	2014
Life	24	27	32	31
Motor	42	37	31	29
Household	10	14	21	28
Other	7	5	8	7

Required:

Draw a project's component bar chart to illustrate the data **(8 marks)**

c) Explain three main kinds of statistical errors **(3 marks)**

QUESTION FIVE

a) The table below gives the monthly cost in Kshs of some necessities in two towns in the outlets of Nairobi city. Each necessity has been given a weight as a measure of its importance to living and working in Nairobi. Anne got a job in the city and she is contemplating residing in one of the two towns.

Items/ commodity	Cost (Town A)	Cost (Town B)	Weight (W)
Food	7500	6000	2.0
Clothes	500	450	1.8
Shelter	7500	8000	1.5
Transport	1600	1800	1.2
Security	1000	900	1.4
Health	8000	10,000	1.0

Taking town A as the base region, calculate the cost of living index and advice Anne accordingly **(12 marks)**

b) State three advantages of mean as a measure of central tendency **(3 marks)**

QUESTION SIX

a) The data below shows the demand for a particular brand of razor in a shop for each of the last nine months.

Months	1	2	3	4	5	6	7	8	9
Demand	10	12	13	17	15	19	20	21	20

i. Calculate a three month moving average for months three to nine. What would be your forecast for the demand in month ten? **(8 marks)**

ii. Apply exponential smoothing with a smoothing constant of 0.3 to derive a forecast for the demand in month ten assuming the forecast for month nine as 22? **(3 marks)**

b) A certain project has 415 employees: 76 work under manager A only, 123 work under manager B only and 45 work under both managers A and B. use a Venn diagram to show how many employees work under neither manager A nor manager B? **(4 marks)**

FORMULAS

Mean, $\bar{x} = \frac{\sum FX}{\sum F}$

Median, $X_d = L + \frac{i}{F}(M - C)$ or Median $= L + \left(\frac{\frac{N}{2} - F_{m-1}}{f_m}\right).c$

Standard deviation, $\delta = \sqrt{\frac{\sum fx^2}{\sum f} - \left(\frac{\sum fx}{\sum f}\right)^2}$ or Standard deviation, $\sigma = \sqrt{\frac{\sum fx^2}{\sum f} - \bar{x}^2}$

Karl Pearson coefficient of Skewness, $SK = 3 \times \frac{(\text{mean} - \text{median})}{\text{Standard deviation}}$

Rank Correlation, $R = 1 - \frac{6\sum d^2}{n(n^2 - 1)}$

Regression Equation, $Y = a + bx$ Where $a = \frac{\sum y - b\sum x}{n}$ $b = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2}$

Exponential smoothing:

New forecast = Old forecast + α (Latest Observation – Old forecast)

Price Relative = P_1/P_0

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$